Clustering and the Digital Economy: New Media in Toronto

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Over the last three decades references to the 'digital economy' or the 'new economy' have been commonly used to signify the intensive development and application of Information and Communication Technologies (ICT). At one time these terms might have been applied to hardware and software technologies, but increasingly scholars have emphasized the breadth of social, economic and policy changes and economy-wide growth processes that derive from the implementation of these technologies (Lipsey 2002). Accordingly, it is important to adopt an inclusive conception of the digital economy, such as that provided by Kling and Lamb, who include the "goods or services whose development, production, sale, or provision is critically dependent upon digital technologies" (2000: 297).

The broad definition accommodates growth of the digital economy in new areas. An increasing range of activities is adopting these new technologies and stimulating new products. Driving this growth is the enormous increase in demand for digital information, transactional and cultural products, and services. Of particular importance in this paper are new media firms that have proved to be particularly significant as providers of producer and consumer services, often through interactive digital systems and content that integrate visual, audio and text information. Thus, new media firms have been responsible for the digital-transformation of traditional services and for the development of new products that are among the most visible aspects of the new 'digital economy' - hence the term "new media", previously multi-media, is applied.

The expansion of the digital economy through the 1990s is indicated by the growth of the workforce of the Information and Communications Technologies (ICT) sector. In Canada, the ICT workforce was 570,000 in 2003, with over three-fourths employed in the service sector. Over the 1990's, the ICT workforce increased by 73 % compared with 12 % for the total labour force, and the growth in

ISSN: 0705-4580 Printed in Canada/Imprimé au Canada

Toronto's ICT workforce (127 %) was a strong influence because it had the largest concentration of ICT employment (28 %).[1] By the beginning of 2001, the growth trajectory of the 1990s was over. The international bubble economy that had emerged based on grossly speculative investments in ICT had burst. This had an adverse impact in Canada and since 2000 there has been little growth recorded in ICT.

As an indicator of Canada's digital employment, official ICT data is limited, as only well-established activities have been included in its definition. Data compilations have lagged and exclude many firms, particularly those in new media which are responsible for digital versions of conventional services and the development of new products as outlined above.[2] Nevertheless, national survey data on new media indicate that its experience parallels that of ICT, namely one of growth and then significant restructuring, as super-heated demand has given way to more constrained market conditions.[3]

In this paper, we identify Toronto as a major, if not the leading, new media concentration in Canada. In that respect, understanding new media adds to our knowledge about the location and dynamics of change in the ICT portion of the digital economy. The conceptual underpinning of our research is cluster theory, as this integrates ideas that explain the locational concentration of economic activities. Our research agenda focuses on three issues.

First, we assess the national and regional factors that have encouraged the localization of new media in Toronto. Our approach considers both the national concentration of corporate headquarters, a source of significant clients, and the strong localization of talent in computer graphics.

Second, we turn attention to the spatial concentration of predominantly small new media firms within the Toronto metropolitan region and examine the locational, production, market and institutional relationships involved. We evaluate three sets of explanations -- those focused on proximity and visibility to leading clients, those related to patterns of social interaction among workers, and those concerned with the smooth functioning of personal and creative networks.

Third, we then seek to understand how new media firms have adjusted to the end of the bubble economy and whether clustering has been an advantage. Firms are now smaller in scale and resources and the key issue is whether and how they have offset these changes. Finally, we explore how well the policy instruments of the federal and the provincial governments have assisted the industry. Though public policy could be used to develop firms that are innovators in the implementation of digital technology, we find, to the contrary, that there is inconsistent depth and little policy focus on Toronto's new media industry.

1. Toronto was followed by Montreal (18%), Ottawa-Hull and Vancouver; see Statistics Canada (2002, 2003).
2. These ICT data used 1997 4-digit NAICS-defined industries; when 2002 definitions are implemented ICT will include selected activities from the information and cultural industries.
3. Industry reports estimated national employment at 20,000 FTE in 2002 (www.hrdc-drhc.gc.ca) but the peak was estimated to be as large as 30,000 in 2001 (www.delvinia.com).

The Cluster Concept

Recognition of the advantages of clustering for economic activities has a long history, dating back to Alfred Marshall's discussion of agglomeration at the end of the nineteenth century. Research on industrial clusters, however, has attained new prominence. A major reason is that as the rapid pace of technological change continues, so new activities have emerged in new places, often in concentrated location patterns. Moreover, the structural "competitive diamond" developed by Porter (2000) to explain the development of clusters, has encouraged various levels of government and international development agencies to link the success of urban centres to the development of local economic specializations and to support various forms of intervention (Egan 2000 and ICF Consulting; Wu 2005; OECD 2001; US EDA 1997; UK DTI 2003). This use of the cluster concept in a policy context has focused new attention on the existence of conceptually different cluster models, though our starting point is the "pure" agglomeration model outlined by Gordon and McCann (2000). In the case we report in this paper, we attach considerable importance to the elements that they include in their social-networking model. Increased use of cluster concepts has exposed the imprecision in the geographic scale at which we should seek to define and evaluate the advantages of agglomerations. This is a perplexing element within Porter's work and Martin and Sunley (2003) explore the equally wide range of applications seen in the work of a large number of other scholars. In some cases, multiple or single metropolitan areas,[4] or intra-urban zones are clearly identified as having the critical locational concentration of relevant firms (Cooke 2002; Porter 2000; Wolfe and Gertler 2003). There are, however, only practical, not theoretical, solutions to this essentially geographic problem. In our research we recognize the localization of new media within the Canadian urban system and then focus on the intra-urban pattern of clustered locations within Toronto.

Increasingly, the research literature has focused more on recognizing that there is a need to understand how and where nodes of specialized economic activity form, more-or-less spontaneously, across a very wide frontier of new economic activities. The primary interest is whether they generate new technology, as occurs in biotechnology (Fuchs 2003), or are responsible for the creative use of technology that is widely available, as in the case of new media (Scott 2000; Pratt 2000; Heydebrand and Mirón 2002; Lash and Wittel 2002). At the macro urban scale, Florida (2004) and others (Gertler et al 2002) have recognized high ranking creative cities, such as Toronto, and argue persuasively that openness, diversity and tolerance are the keys to understanding the way technology and talent flow to them and initiate and enrich the activities that make up their specializations. At the micro level, too, theory has been developed that focuses on the processes that lead to the formation of an individual agglomeration of a particular economic activity and that sustain the cluster, and it is this approach which is followed in the research reported in this paper.

4. The group of cities and towns in Silicon Valley illustrates an extensive metropolitan case.

The *sine qua non* of a cluster is the spatial concentration of similar firms. Within this geographic context, it is rational to seek an understanding of the origin and maintenance of the cluster in the horizontal dimension (Malmberg and Maskell 2002). This becomes possible because a cluster is usually specified in industrial terms and includes a circumscribed set of closely connected activities producing competitive goods and services. The strength of this structure is that it can encourage firms to generate alternative ideas. This is of particular relevance in creative fields such as new media where the scale of businesses is very small and they are constantly challenged to produce new output that does not replicate earlier or contemporary projects. While firms are required to be fertile sources of functionally and visibly new solutions, clustering provides valuable opportunities for them to monitor solutions of competitors and to imitate or adapt apparently successful choices by others (Maskell 2001). Functionally, clusters are generated and supported also by vertical relationships; these involve the direct and indirect functional ties between the various businesses and to other members of the cluster. Moreover, clusters generate a high degree of industrial coherence as firms relate to one another through interdependence and competition, and through close relationships with various supporting institutions.

New industrial processes, organizational arrangements, and economic activities mean constant evolution of the basic theory of clusters. Their fundamental nature is dynamic and, therefore, they are constantly engaged in a learning process of "trial, feedback and evaluation" as firms meet the needs of clients through their creativity in using new technology (Teece and Pisano 1998). The localized pattern of these learning-by-using activities is a source of increasing returns to the cluster (Storper 1992). Small firms, in particular, are likely to attempt to augment their constrained resources through connections with others and thus they may be stronger agents of clustering through their need for closer interrelationships. Nevertheless, it is always necessary to evaluate actual local user-producer connections, sub-contracting and similar relationships, especially as digital technologies lend firms new capabilities to seek markets and inputs outside their locational concentrations. It is inappropriate to assume important local vertical relationships between firms (along value chains) simply because of spatial concentration. There is increasing evidence that in some industries, especially manufacturing, the relationship between proximity and value chain connections (both forward and back) may be quite modest, as cost savings prove limited or local opportunities weak (Britton 2003; Malmberg and Maskell 2002; Simmie 1998). For producer services like new media, it is plausible that forward links may involve both local and distant markets and may evolve over time as firms gain expertise and reputation.

The evidence that local flows of goods and services may be modest has garnered support for a complementary strand of theorizing, which emphasizes that knowledge spillovers are facilitated by co-location of related activities. These untraded interdependencies[5] relate to the circulation of knowledge, an essential

5. Dosi (1988) seems to have coined this term but its greatest development is by Storper (1999).

mechanism if a cluster is to accumulate know-how. Trust-based relationships and other forms of personal and inter-firm networking may produce this kind of cluster advantage based on the circulation of tacit knowledge. Networking might be manifest through various forms of collaboration, even cooperative activities, which may stimulate further interaction. Similarly, the social basis for local networking has recognized the role of gossip and other informal flows of information (Henry and Pinch 2000). An important agent identified in the literature on Silicon Valley, is a relatively free flow of labour between employers (Saxenian 1999; Scott 2004). Thus the dynamics of the local labour market, including the depth of the pool of talent and the degree of local mobility, are of further importance to understanding cluster-advantages and the innovations they produce. Thus, clusters provide a manifestation of broadly defined social processes as a vital underpinning of innovation.

Collectively, untraded interdependencies could go a long way towards establishing common practices within established or nascent clusters (Maskell 2001). The literature, however, is best described as a mix of cases that provide plausible evidence of local knowledge spillovers, while others are populated with firms adept at establishing extra-regional connections with knowledge partners. This variation in the knowledge characteristics of industries yields two broad types of clusters (Asheim and Coenen 2004). Analytic (science based) clusters innovate by generating new knowledge through the process of R&D and their firms tend to find the strongly codified basis of scientific knowledge assists interregional communication. Synthetic clusters like new media, where technical knowledge is supplied by other sectors, rely more on interactive learning with their clients, equipment suppliers, and consultants and incremental innovation tends to prevail. These networking skills, coupled with tacit forms of knowledge and artisan-like skills, mean that new media firms are likely to enjoy gains that fit the category of untraded interdependencies and that these will tend to be localized.

Finally, recent research points to the way that places evolve in terms of their institutional identity, which at any one time is an amalgam of formal organizations, as well as practices and customs employed by firms, consultants, and others. According to Braczyk and Heidenreich (1998), the way (technological) knowledge is generated, circulated and used, is very much a product of the educational and financial systems and the industrial and professional relations of particular places. They also acknowledge that clusters exist within larger institutional structures, especially regional innovation systems (RIS), which produce the commonalities that exist in the infrastructural and policy environment of otherwise quite dissimilar clusters and other industries (Bracyzyk and Heidenreich 1998; Wolfe 2002).

An Overview of the New Media Industry

The origins of new media lie in three seemingly different areas of production: first, in the entertainment sector -- providing (broadly) graphics services for film and television program makers; second, in using graphics techniques to produce commercials and television logos and the like; and third, in business services

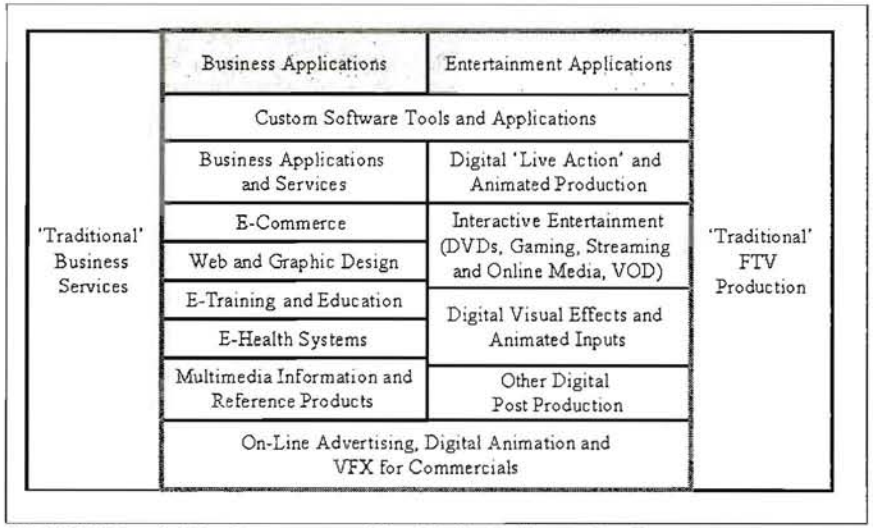

FIGURE 1 Interlocking Components of New Media Activity: A Typology

involved in training, and in distributing and accessing information. New media has substituted digital technologies for activities that used traditional production methods and thereby enhanced the capabilities of firms and created new services. In Figure 1, we have represented this pattern of change over the range of new media products. The availability of hardware and software systems, broadband Internet service, and web-hosting services are essential for supporting interaction between firms, new media production itself, and as an alternative (or even the main) means to access a variety of products. For the sake of simplicity, however, these technological and infrastructural elements are excluded from Figure 1.

We have separated services output designed for the business market from output destined for the cultural or entertainment sector, as these represent identifiably different market segments in the development of this industry. Advertising and communication services, however, have always occupied a middle ground between entertainment and business and increasingly the two product segments continue to converge, and Figure 1 represents this. Though television commercials were one of the earliest new media products, on-line commercials are now enriched with content from the entertainment sphere and digital animation techniques are important in advertising in websites, banners, pop-ups and other related products. Moreover, animation is now a standard, rather than a novel, component in training, educational and informational products available on DVDs and via the Internet.

Over the past decade, many corporate clients have turned to the Internet for secure internal distribution of information for a variety of management, training, and communication purposes, to allow public on-line searching of information files, and for e-business. Moreover, broadband Internet service in private use has made a growing residential market accessible to retailers of goods and services and

for a variety of on-line entertainment products. The accessibility of broadband service raises expectations for high quality graphic design and artistic creativity in an increased variety of web-services and correspondingly, there has been a direct increase in demand from this quarter for new media services. The relationship between new media firms and the so-called "dot-coms" and current on-line retailers is one of service provider to client.

The strength of new media is its early adoption of new digital platforms and software tools and learning-by-using. Firms are commercially successful by means of creative applications of, rather than by their design of, software. Continuous innovation is manifest through the development of novel applications of software, especially new animated, interactive creative content and digital tools. Innovation in new media reflects the way firms and individuals strive to design products with particular functions and content, achieved through a unique melding of technology, aesthetic design and artistic forms of creativity.

In process terms, new media firms rely on face-to-face consultation with clients and they develop new designs and products to meet their needs. These solutions are highly customized and there is often a need for fast replacement and continuous incremental innovation in this essentially project-based industry (Ekinsmyth 2000; Grabher 2000; Britton and Legare 2004). This means it is extremely difficult for firms to generate production returns to scale. This interpretation is reinforced by other characteristics of the industry. First, many (software) technologies are available even within the budgets of very small firms. Second, there is virtually no possibility of substituting capital (that is, technology) for labour, since creative and technically skilled workers are the key element in the competitiveness of firms (Hitters and Richards 2002). Third, virtual- or network-firms can co-exist with businesses that maintain conventional workplaces for core workers. Fourth, the intellectual assets of most firms are limited to their human capital. While some R&D is undertaken, most innovation takes the form of incremental, creative advances and these are not subject to patent or trademark protection. A consequence is that venture finance generally is not available to support growth, thus further inducing the industry to be populated largely by many small-scale businesses. How they seek to realize external returns from clustering has been the focus of this research.

New Media in Toronto

The relatively recent development of new media means there is limited publicly available data on the industry in Canada and there is no official definition. Nevertheless, industry estimates put national employment at 20,000 FTE in 2002,[6] though as a consequence of an accelerated turnover of firms and employment, this declined from a peak estimated to be as large as 30,000 in 2001.[7] Toronto and

6. See, www.hrdc-drhc.gc.ca
7. See, www.delvinia.com.

Montreal are the largest new media centres in Canada, and estimates from Industry Canada indicate that Toronto has over 550 firms and between 4,000 and 8,000 people employed.[8] The estimates from a consultant's report (EKOS 2004), put Toronto's current share of the Canadian industry at 37 % of the population of 1, 775 new media businesses. These estimates, though fraught with definitional differences, provide crosschecks on our database of just fewer than 600 firms and 8,600 workers in firms of all sizes (including single-person businesses) that we compiled for this project. We collected names from recently published reports, on-line membership lists, and service directories that included new media firms. The period of instability for the industry after 2001 meant directories and the membership lists of new media organizations became unreliable guides, as they tended to be depositories of both current and former names. We eliminated redundancies, misclassified firms, and those without a functioning website, and used the latter to judge the relevance of each business. We obtained employment data from some of the sources listed above and from similar inquiries, but interviews, telephone calls and emails were needed for about 50 % of the entries. There are in addition many freelancers, consultants, programmers, and web-designers not counted fully in the database because many do not pay membership fees or have not put up a website that we could find.[9]

The size distribution of new media businesses in Toronto verifies their predominantly small-scale. Single-person businesses claim more than 25 % of the total and this drives the median size down to four and 73 % of firms have 20 or fewer workers (Table 1). The division of new media in Toronto (Table 2) is one that shows a larger number of firms and work opportunities in the business segment compared with entertainment. This result, however, is likely to be the result of two variables. First, the timing of our canvassing for employment data affects the apparent development of the segment, as the level of work in some of the large entertainment firms, in particular, was much higher a few years ago. Second, the scale of projects has been much larger in entertainment and part-time and temporary hiring in response has been commensurate; this is reflected in our data. The timing and scale of projects undertaken by firms can determine the scale at any one time of firms in either segment. Thus, employment needs to be viewed as a fluid measure of business activity because of the contingent nature of at least part of the labour force of firms. This kind of reality allows virtual- or network-firms to exist and to be organizationally distinguished by the way close relationships between freelance specialists allow them to bid on projects as 'established' collectives.[10]

Despite the overwhelming small firm characteristic of new media, the pres-

8. Data were accessed from: http://strategis.ic.gc.ca/epic/internet/inict_c-g_tic.nsf/en/h_tk00184e.html.

9. The workforce experienced rapid change between 2001 and 2004 so it is difficult to apply data from the 2001 census, which shows 25% of web designers/developers and graphic designers/illustrators in the Toronto CMA worked at home. Currently, there could be 1,000-3,000 in this category.

10. These businesses have been included using a median level of employees.

TABLE 1 New Media Database: Toronto Region, 2004 (percent of regional total)

	Number of firms n=594	
Workers	Central area[1] per cent	Other Toronto region per cent
1	7	20
38752	12	17
38877	8	9
39040	6	5
21-40	6	3
41-100	2	2
101-400	2	1
TOTAL firms	43	57

Note: 1. Central area corresponds to the area of spatial concentration identified in Brail (1998), also see footnote 14.

Source: Database compiled by authors from on-line and printed directories and telephone and e-mail inquiries.

TABLE 2 Activity Distribution of New Media: Toronto, 2004 (percent of regional totals)

	Workers		Firms	
	Central area	Other Toronto	Central area	Other Toronto
Entertainment segment	28	14	19	22
Business segment	29	29	23	35
	58	42	43	57

Source: Database compiled by authors

ence of a small number of larger companies is evident and while some of these are branch establishments, not all branches are necessarily large. The large scale of many branches derives from branding advantages at the inter-city/international level that have been realized because of their reputation in hardware or software production, computer services, or in advertising. The main exceptions tend to be from within new media -- especially production services for film makers and games - and even in their case Toronto establishments have been acquired mainly by international firms. We treat Toronto establishments that belong to multi-locational companies as indistinguishable from locally generated businesses.

In addition to information published in print and especially on the web, we base the following discussion on over 65 interviews in the industry during 2003-2005. Interviews in the financial sector, education, and organizations of firms and workers within the new media industry were part of the total. The executives of over 50 firms were the largest group of participants. Public research advisors and other key informants within the industry were invaluable in the initial stages of designing the allocation of interviews so that we could identify firms representing different facets of new media. The sample of interviewed firms was also selected so that while including firms of all sizes, we would include a higher proportion of the larger-sized businesses. We have achieved this, and the mean employment size of the sample is 44 employees. The sample is divided more or less equally at a size

of 20 workers, while in the population 73 % have 20 or fewer workers. Nevertheless, we interviewed firms with as few as three workers, with the sample being divided at a ratio of 3:2 between business segment firms and those serving entertainment markets. The process was sensitive to the history and reputations of firms and for that reason we began interviewing in the central area of Toronto and then increasingly drew in firms located in suburban areas. The scope of interviews[11] included questions about company structure and background; networking, relationships, suppliers and customers; local cluster characteristics and the evidence of social capital; and the locational and infrastructure factors important for the firm. Because some of the information that was sought was of a sensitive nature, especially for private firms, all interviews were conducted under a protocol of confidentiality and the results are reported in this way.

The Origins of New Media Strength

Clients in business and entertainment

Toronto's new media concentration follows an international pattern in which the industry emerges as co-located with its market leaders (Scott 2000; Cooke 2002; Lash and Wittel 2002; Pratt 2000; Searle and de Valence 2005). Toronto's large Canadian share of corporate decision-making centres, especially the head offices of the Canadian financial services industry, has been an important direct influence on the development of business-oriented new media firms. The localization of Canadian corporate offices is an outcome of long-term processes of metropolitan concentration and consolidation (Semple 1996). In the financial sector, deregulation had an influence and the substantial scale of Canadian banks has supported their interest in new managerial and service opportunities (Dobilas 1996). Their digital financial transactions grew with the expansion of Internet based services. By the late 1990s, banks and insurance companies had switched their corporate training programs from courses using CD-ROMs to intranets, and had adopted solutions provided by local firms for e-marketing and corporate communications, thus advancing from one generation of new media products to another (Newman-Provost 1998). Interviews indicated that quite modestly sized firms in Toronto have had continuing relationships with these large corporate clients.

Advertising agencies, also dependent on the large business client base of Toronto, continue to be another major source of demand for new media firms, especially as initially they outsourced their television and on-line content from new media specialists. Many still do, though the largest have interactive divisions. As new media firms have developed skills in information dissemination, communications, and various on-line services including catalogues, e-commerce, e-mail marketing, branding, and various other promotional activities, they have established relations with clients in a very broad array of industries, including the public sector. Though firms were reluctant to discuss their relationship with particular firms, their websites often include lists of clients, and interviews established that in many cases there is a continuing relationship.

11. Interviews follow the major elements of a collective interview guide developed in the SSHRC sponsored research project - Innovation Systems and Economic Development: The Role of Local and Regional Clusters in Canada. The current research project is one of nearly 30 case studies that have examined the impact and importance of cluster-driven innovation in Canada. See: Innovation System Research Network (http://www.utoronto.ca/isrn/web_files/aboutus).

Though the evolution of the entertainment segment of the new media industry is more complex, market and institutional choices favoured Toronto, as it had long been the major centre for the Anglo-Canadian cultural industry sector - visual arts, live theatre, music, and publishing. The film production industry that emerged from this theatrical environment has enjoyed 40 years of national and provincial support, and demand for content by Canadian television networks. From the late 1970s, the decline in the CDN $ increased the attractiveness of film production in Toronto by U.S. companies, while the introduction of subsidy and tax credit programs for Canadian[12] content and for Canadian labour expenses stimulated the film and television industry, especially the production of dramatic series, and made-for-television films and cartoons. These activities relied primarily on a North American market and stimulated the further development of visual effects, animation and post-production services. These digital services are a Toronto-strength and have spawned a broader entertainment segment in new media, including games and various other uses of animation.

With a longer history, this part of new media has more firms that have reached larger sizes. The largest, Nelvana (animated cartoons for children) for example, was founded more than three decades ago and by the late 1990s employed more than 700, though after its acquisition by Corus Entertainment and the contraction in markets for new media products, its employment in Toronto is much smaller. Despite the setbacks that new media has experienced, our interviews established that both this segment and that catering to the business market, contain recently founded businesses focused on imperfectly served niches; some of these have appeared after the downsizing of larger firms, while some involve individuals seeking to escape more diversified businesses.

The talent pool

The production of films and television programs spawned firms that could apply traditional graphic-arts expertise and creativity to visual and special effects, post-production work, and animation. In the late-1980s, an unanticipated convergence of traditional skills and new technology was forged and the skills and reputation of these workers and firms were transferred to a digital technology base and became part of the emergent new media cluster. This international trend is represented in Toronto and is revealed by the ages of firms. Entertainment firms on

12. The definition of 'qualifying Canadian content' has continued to change over time. It is a condition of retaining a television-broadcasting license from the CRTC.

average date from the early 1990s whereas the business-market firms were formed more recently (mean 1995) and with a much smaller proportion of firms emerging from a non-digital technology base.

New media realized the potential that came from computer graphics programmers with creative interests and self-trained hackers who interacted with database programmers and graphics arts specialists. As software and hardware moved towards the status of relatively standardized platforms, imitation was easier and learning-on-the-job became the norm. Many interviewees stressed that much of the innovative output of firms, in both the programming and creative spheres of new media, was a result of traditional skills converging with new technology in the context of 'learning' and 'experimentation'. All firms we interviewed reported on the depth of Toronto's talent pool of experienced, creative workers and many situated this region in a very small peer group of cities. Nevertheless, there was an undercurrent in many discussions that the experience of older members of the talent pool contrasts sharply with the lack of 'production experience' of recently trained graduates of college new media programs or university computer science departments. The origin of this difference may well be attributed to the comparatively tight economic conditions for new media firms today as these have made internships or opportunities for hands-on experience much scarcer. This is an outcome of reduced margins and the expense of workstation time and software licenses, as is the increase in part-time, freelance or contract work.[13]

Nevertheless, most managers had no doubts that the institutions that provide training and public support for the industry are a clear source of advantage for the future of new media. Though some senior people implement this view by being involved in college curriculum committees and classroom and related appearances, we discovered that this kind of involvement is limited, a reflection perhaps of the slower growth period of the present and the very small scale of the majority of firms.

Why are new media firms spatially clustered?

The consistent impression gained from the international literature is that new media establishments are spatially concentrated within metropolitan regions. Similarly, earlier research on Toronto indicated the importance of a pattern of central city localization. Brail (1998) found one third of the known population of firms (of 327 in the Greater Toronto Area in 1997) were located in the central area of the city that includes the central business core, the surrounding area of mixed commercial, residential and (residual) industrial activities, and the commercial uptown area.[14] As noted earlier, the population of new media businesses is now

13. Scott (2004) points to the intensive social networking undertaken by workers in new media.

14. In detail, the area includes the uptown commercial area of Bloor Street (in the north), the CBD and stops only at the lakeshore (in the south). It is bound by the Don Valley Parkway in the east and Parkside Drive (High Park) in the west. The densest concentrations are found between Dundas and Front Streets.

nearly 600 and this same relatively limited central area is still a zone of dense concentration of new media firms. Moreover, the importance of the pattern has increased, as 43 per cent of businesses are now located there and they are responsible for 58 % of total employment in new media (Table 1).

New media are not located uniformly within the central area: rather, three precincts are of greatest importance - Dundas Street West to the Don Valley Parkway centred on King Street; Liberty Village to the west of the downtown, and the Bloor-Yonge intersection in the uptown commercial area. If the majority of larger new media firms are in the central area, it is also true that many ultra-small businesses, often associated with the design of basic websites, follow a strongly dispersed pattern in common with that of freelancers who usually work from their homes. This pattern is reflected in Table 1 where 46 % of firms employ 10 or fewer workers and are scattered over a very large suburban territory. When judged by the standard of Liberty Village or the Bloor-Yonge area, there is no comparable clustering outside the central area.

The location of established firms in pockets of concentration around the fringe of the downtown, has an on-going logic, since this pattern yields close proximity to major corporate clients and good transit access makes it easy to integrate contract workers, especially freelancers, into new projects. In our interviews, it was quite clear that the vast majority of executives rated downtown locations as highly advantageous for networking. Contacts between key personnel of new media firms are facilitated, as are meetings with clients, and firms are more visible to potential clients. Many firms are located in former warehouse and manufacturing buildings from the nineteenth century,[15] where the relatively low rents during the 1990s encouraged localization. An informal work atmosphere and the club scene in the same area have attracted young workers and facilitated the churning of full-time and part-time employees and freelancers (especially in the 1990s), which contributed to a substantial flow of company gossip and the informal circulation of technical and creative knowledge.

The extent of dispersion of firms of all sizes throughout the region has several causes: some firms have entered new media from other lines of production such as publishing; others have gained a measure of accessibility for clients and workers by selecting locations very near major expressways, especially the Don Valley Parkway and its northern extension. In other cases, interviews indicate that the dispersed location of firms is related to the suburban location of training programs, and for website designers the client base is often in employment centres in suburban parts of the region. The dominant response of suburban firms is that they have not developed close connections with other new media firms, except when they have a specialist supplier role and their main input relations are with technology suppliers. By way of contrast, the concentrated geography of firms in the central area has generated opportunities for them to monitor advances by competitors and to imitate and innovate within this advantageous learning environment. All firms

15. This applies to Liberty Village and much of the King Street corridor but not the Yonge-Bloor area.

we interviewed in central location were well aware of their immediate competitors and their strategies. These firms also indicated which specialist suppliers they used for animation, audio or visual special effects, website usability, or for contracting-out when excess workload was encountered. These were invariably located within the central area and were viewed as being part of a localized production network.

Surviving the Downturn

In the late 1990s, most of Toronto's new media firms were independent, small, and operated with a core group of employees while secondary employees were hired on an as-needed basis. Firms were competitive, and there was little evidence of trust-based relationships between comparably sized firms with similar or complementary assets, and little collaboration or information sharing between them (Brail 1998). A consultant's report explained that the industry had grown without developing cooperation and was identified as less collaborative than was evident in major U.S. locations of new media, though effective connections existed between individuals (PWC 2000). Venture capital was limited to larger firms (Brail and Gertler 1999). Nevertheless, fast growth in the number and scale of firms was evident in the late 1990s, many firms hired in anticipation of a continuing growth trajectory, and wages rose rapidly.

This was before early 2001 and the 'dot-com bust.' This rapid deflation in the share prices of companies in the early phases of selling on-line quickly spread to the whole digital economy and further, was a body-blow to new media businesses, which had supplied websites equipped with e-business capability. As the current population of firms is about twice that of the 1997 count, the important question is how firms and institutions adapted to the new circumstances of market contraction.

Survivors have reduced employment and focus on their core competencies, while an even larger part of the talent-pool is found among freelance/consultants. Equity investors have even less interest in the majority of firms – they are too small and their assets are in the form of human talent rather than intellectual property. The project-based organization of production still dominates and the revenues of firms reflect their primarily fee-for-services nature. Nevertheless, established firms have long-term relationships with clients and seek to make revenues more predictable; as a consequence, 'maintenance' contracts and/or licensing fees for proprietary solutions are more common now (Aster 2003).

The evolution of entertainment firms has allowed them to secure a stronger market position in the U.S. (average, 40 % of sales) than is true for business-oriented firms (18 %, p=0.10). Still, there are differences among entertainment firms in terms of exports: producers of video and computer games and related products, for example, are linked to (mainly local) publishers/ distributors, though international sales are the goal. Animators, producers of visual effects, and post-production firms, however, function within film and television production systems directed from both Toronto and Hollywood. For business segment firms, clients

are drawn from a wide range of sectors, though the financial services sector was an early leader. In interviews, firms claimed that they are achieving U.S. sales on the basis of expertise and competing through the creativity of their solutions, thus verifying that local learning-by-doing has allowed them to build a core workforce, and subsequently, to demonstrate their expertise when bidding for projects elsewhere. The level of the Canadian dollar has helped the revenue of firms who undertake much of their production for U.S. projects in Toronto: nevertheless, firms were uniformly convinced that they did not secure contracts by low pricing.

In production terms, in contrast with the profile of the industry 7 years ago, firms can no longer be accused of ignoring the value of local horizontal linkages, since interviews reveal the development of collaborative co-bidding arrangements by many small firms located in the central area. Small firms currently outside these arrangements are aware of this approach to competition against larger operations, a number indicated in interviews that they were about to move to closer bidding relationships, while others compete for projects but rely on a sharing of work. Only a small minority of small firms exists outside arrangements of this type. The increased degree of specialization of firms (with scale reduction) has increased vertical relationships between firms: large and small firms, for example, undertake subcontracting, usually supplied by small firms. Larger firms seek these production inputs to avoid the expansion of in-house activities to meet production peaks. In other cases, as noted above, there is an extensive supply network of animators, visual and audio special effects firms, programmers, games producers, website usability testers, security and market metric services and others which are drawn into a myriad of vertical linkages.

The conventions of the cluster have changed since the euphoria of the growth regime waned, especially within the central area. Firms have specialized, learnt how to collaborate, and extended their relationships. The inference should be that Toronto's new media firms have been adaptive and have learnt new modes of working that include inter-firm interdependence without being less competitive. They have continued their informal acquisition of tacit knowledge about superior design ideas, software tools, suppliers, and market openings. These untraded cluster interdependencies have become more important and better developed as time passes. They depend on personal networks that parallel inter-firm relationships and are assisted by the flow of freelancers and other workers as they change employers, penetrate the boundaries of firms and leave traces of their expertise.

The Institutional Environment of New Media

If the intensification of untraded relationships reflects stronger cluster characteristics, Toronto's new media industry still lacks well-structured institutions, despite the greater needs, since 2001, by both small firms and individual workers. Associations serving firms with an entertainment focus are notably poorly developed, perhaps because clients in the film/television market are fairly well established. Business service firms, by contrast, have more need for visibility and markets. Consequently, firms have invested in cooperative initiatives to help with collective

identity, access to potential clients and to provide peer-recognition of best- practice. The Association of Internet Marketing and Sales (AIMS) does exactly those things and many firms had substantial praise for it. Most other associations with broader missions to establish a recognizable voice and image for the Toronto's new media cluster have died.[16] The chief exception is the New Media Business Alliance, which represents the interests of digital content production and in that respect it parallels AIMS. The Province of Ontario has lent broad support but its strategy has never been clear. Perhaps its main project among organizations was *Smart Toronto*, which grew by absorbing a number of other local initiatives (into *Smart Toronto Technology Alliance*) but was later acquired by a national high-tech lobbying association (CATA), which ended its ability to represent the cluster.

The absence of a common definition of the industry and an official, current database, must limit understanding of the industry at the various levels of government (Britton and Legare 2004). Tertiary level colleges funded by the province have generated an expanding cohort of workers, but direct support received by business-market firms is limited to R&D expenses. Only a small number have followed this route, partly because of the nature of innovation in new media. Nevertheless, there is great variance among firms in the support they actually have received, and interviews suggest that many new media firms are unfamiliar with the standard sources.[17] The entertainment related firms derive some benefits from programs designed to support the film and television industry. At the federal level, firms may access funding from the Canada Council for the Arts, the Canadian New Media Fund (Telefilm Canada), and the Bell Broadcast and New Media Fund; and at the provincial level, the Ontario Media Development Corporation (OMDC) potentially can help firms with creative, digital products. Nevertheless, most firms are confused about what qualifies as Canadian content, how decisions are made, about application procedures, about rules on IP rights and most do not obtain funds. Moreover, funding does not compensate for the difficulties firms encounter in producing commercially viable products that meet the Canadian content requirement.

Conclusions

New media is a distinctive component of the digital economy. It is composed mainly of very small firms that provide services to a variety of clients, relying on a project-by-project organization of production. It is primarily a creative user, rather than a generator of, new technology, and the talent of its labour force is crucial to its ability to create innovative products. It is quite different from the hardware and software producers of the ICT sector, the often-used proxy for the

16. The latest exit is that of *Spadina Bus*, whose activities represented the economic and other interests of one central pocket of firms. Though supported by the province, it closed in April 2004 after only 4 years of representing its "e-business community".

17. Primary sources are grants from IRAP and tax credits through the SR&ED program.

digital economy. New media is now inseparable from the Internet, though not synonymous with it, and its growth, the increasing diversity of its interactive products, and the sectoral range of its clients, is symptomatic of the creative possibilities in the expanding intersection of the digital cultural economy and business applications.

Its locational characteristics give it a clear geographical signature since it is attracted to central city areas. One strong reason is that its firms do not have ready access to significant internal scale economies of production that would substitute for the external returns to clustering they currently enjoy, especially in terms of their access to creative workers. There is, however, a scattering of web designers in suburban locations.

Despite the jolt to new media firms when the bubble economy ended, the Toronto cluster has manifested substantial resilience. Cluster learning has been demonstrated by the way many firms have trimmed excess capacity, stressed specialization and intensified the level of cluster interdependence. There is now a superior sense of the advantages of collaborative and cooperative business choices and in that sense the industry in Toronto (especially the central area) does exemplify the theoretical characteristics of a cluster that we outlined.

Nevertheless, to establish an institutional foundation for the Toronto brand name has proved a challenge for this very young industry. Moreover, in activities such as new media where the majority of firms are very small, there is an onus on public policy to ameliorate the ever-present problems of constrained information assets of individual firms. This has not been achieved in Toronto since most generic programs require even innovative firms to have other skills to access assistance. A closer relationship needs to be forged between innovators and programs available to assist firms undertake activities such as R&D. Similarly, if cultural policies are to be effective, transparent and industrially relevant criteria need to be adopted, otherwise firms will remain frustrated at the elusive fit between intentions and outcomes.

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